

Wind and Hydropower Technologies Program



Securing our Greatest Homeland Energy Resource



The U.S. potential wind resource is over 3,000 gigawatts.

Wind Power

Modern wind turbines can convert winds in most U.S. states and coastal waters into reliable, clean electricity, and research activities underway will yield even more competitive wind technology. While wind today provides only a small percentage of our nation's electricity needs, it is an immense homeland energy resource and the fastest growing energy supply technology.

The United States has abundant, potentially viable wind resources – onshore and offshore – estimated at over 3000 gigawatts. To put this into perspective, 350 GW of installed wind capacity would represent about 20% of our nation's current electricity demand. This is equivalent to the amount of electricity currently

produced by nuclear or natural gas-fired generation.

Wind energy use increases around the globe and here at home through a combination of improved technology, lower cost, stronger market confidence and increased public awareness and demand. Wind capacity harnessed worldwide is approaching 60 gigawatts; at present, Germany has developed 18.4 gigawatts, Spain has developed 10.0 gigawatts and the United States ranks third in wind development with 9.1 gigawatts.

Harvesting and Expanding Our Nation's Wind Crop

Today, the Nation's "wind farms" generate more than 10,000 megawatts

of electricity in over 30 states. Smaller wind systems generate on-site power and provide supplemental electricity to local utilities. Wind systems currently provide enough electricity to serve more than two million households, and the market is expanding at more than 20% annually. However, wind power represents more than just competitively-priced electricity. It offers:

- rural economic benefits from project development
- a hedge against volatile natural gas price and planned use of imported liquid natural gas
- a cost-effective clean air compliance option for businesses and communities
- emissions-free energy with tangible carbon offsets



- options for hydropower and thermoelectric power producers facing low water resource levels
- a strong potential partner for other domestic power industries including coal and nuclear
- a renewable option for producing hydrogen for transportation fuels

The National Investment in Wind Energy – Building on Success

In the U.S. Department of Energy, the Wind and Hydropower Program works with industry to advance wind technology. The Program conducts competitively selected, cost-shared R&D projects with industry, as well as engaging in partnerships with federal and state governments, industry, academia and others. Previous partnerships led to turbine technology advances that lowered cost of wind energy tenfold since 1980, to as low as \$0.04 per kilowatt hour today.

Major efforts to build on this record of success include:

- **Capturing wind resources at abundant lower wind speed sites across the nation.** The Program focuses on low wind speed technology to increase the economically viable wind resource base across the country twentyfold, while moving development opportunities five times closer (on average) to load centers, easing

pressures on the electric transmission system.

- **Capturing huge national offshore wind resources.** Over 900 GW of potential wind power is located offshore near major load centers, including the Northeast, Mid-Atlantic, Gulf, and Great Lakes regions. The Program focus includes developing technology that can effectively capture this resource, first in relatively shallow waters and then in deeper waters, diminishing existing regulatory and siting barriers.
- **Reducing the cost of energy for distributed applications of wind** through turbine research and development in partnership with industry, and collaboratively addressing barriers to those opportunities. The Program focus is on developing grid-connected wind turbines of 100kW or less that are cost competitive in the net-metering market for homeowners, farmers, and small businesses.
- **Exploring emerging markets and applications for wind.** The Program looks to the future roles of wind including a resource for low-cost, clean hydrogen for the transportation sector, and addressing water availability by reducing water use in the power sector by providing low-cost electricity for bulk desalination and purification of water supplies.

The Program is also continuing to work with other agencies, including

two agencies in the U.S. Department of Interior. The Minerals Management Service is cooperating on a regulatory framework related to offshore wind energy projects in federal waters, while the Fish and Wildlife Service is supporting responsible development practices to protect flora and fauna. Also, the Program participates in partnerships to study wind/bat interactions in the Mid-Atlantic region and prairie grouse in the Plains States.



A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.



U.S. Department of Energy

Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

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